IN	FORMATION	DISCLO	SURE	ATTY. DOCKET N	0.	SERIAL NO.		
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PRADENT	/			August 31, 2001		1765		
		Ţ	J.S. PATENT DO	CUMENTS		pan 5.		
EXAMINER'S INITIALS	PATENT NO.	DATE	N	IAME	CLASS	SUBCLASS	FILING DATE	
2.T.U.E.	4,957,605	09/18/90	Hurwitt et al.				04/17/89	
LITHE.	5,369,544	11/29/94	Mastrangelo		•		04/05/93	
L.J.U-E	5,444,837	08/22/95	Bomans et al.				12/29/93	
LITIN-E	5,665,214	09/09/97	Iturralde				05/03/95	
L.J. W-E	5,695,810	12/09/97	Dubin et al.				11/20/96	
L.J.W-E	5,824,599	10/20/98	Schacham-Dian	nand et al.			01/16/96	
LIME	5,825,356	10/20/98	Habib et al.				03/18/96	
L.TWE	5,831,851	11/03/98	Eastburn et al.				03/21/95	
LIME.	5,838,951	11/17/98	Song				08/28/96	
LINE	5,859,777	01/12/99	Yokoyama et al	•			05/13/97	
LITTUE	5,871,805	02/16/99	Lemelson	· · · · · · · · · · · · · · · · · · ·			04/08/96	
Z.TUE	5,943,550	08/24/99	Fulford, Jr. et al	·			03/29/96	
Z.J.M-E	6,012,048	01/04/00	Gustin et al.				05/30/97	
LIME	6,037,664	03/14/00	Zhao et al.				03/31/98	
ZIM-E	6,059,636	05/09/00	Inaba et al.		·		07/09/98	
L.JME	6,096,649	08/01/00	Jang				10/25/99	
L'ATAK.	6,100,195	08/08/00	Chan et al.		-		12/28/98	
LIME.	6,114,238	09/05/00	Liao				05/20/98	
LIME	6,150,270	11/21/00	Matsuda et al.				01/07/99	
XJ.ME	6,157,864	12/05/00	Schwenke et al.				05/08/98	
Z.J. W.E.	6,181,013 B1	01/30/01	Liu et al.				03/13/00	
LINE.	6,212,961 B1	04/10/01	Dvir				02/11/99	
Z The	6,226,563 B1	05/01/01	Lim				09/04/98	
L. JMg	6,237,050 B1	05/22/01	Kim et al.				09/04/98	
2.94-8	2001/0006873 A1	07/05/01	Moore				02/13/01	
25/11-8	6,259,160 B1	07/10/01	Lopatin et al.	···			04/21/99	
L.J.M.E.	6,281,127 B1	08/28/01	Shue	· · · · · · · · · · · · · · · · · · ·			04/15/99	
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EXAMINER'S INITIALS	PATENT NO.	DATE		ANGE	C1 450	CLUD CL A CC	FILING	
000	6,317,643 B1	11/13/01	Dmochowski	AME	CLASS	SUBCLASS	DATE	
LINE.	<u> </u>		·				03/31/99	
List. VE	6,339,727 B1	01/15/02	Ladd			<u> </u>	12/21/98	
LINE	6,355,559 B1	03/12/02	Havemann et al.		-		11/03/00	
LIME	6,391,780 B1	05/21/02	Shih et al.				08/23/99	
4-0	6,417,014 B1	07/09/02	Lam et al.	· · · · · · · · · · · · · · · · · · ·		<u> </u>	10/19/99	
29 N-6	6,427,093 B1	07/30/02	Toprac				10/07/99	
LIJNE.	6,449,524 B1	09/10/02	Miller et al.		· 	<u> </u>	01/04/00	
L.T.ME	6,455,415 B1	09/24/02	Lopatin et al.		<u> </u>	<u> </u>	04/16/01	
LIME.	2002/0165636 A1	11/07/02	Hasan				04/24/02	
L.JME	6,484,064 B1	11/19/02	Campbell				10/05/99	
ZIJME	6,495,452 B1	12/17/02	Shih	<u>.</u>			08/18/99	
LIME	2002/0193899 A1	12/19/02	Shanmugasundra	am et al.			05/01/02	
LITUE.	2003/0017256 A1	01/23/03	Shimane				06/12/02	
R.J.M.E.	6,515,368 B1	02/04/03	Lopatin et al.				12/07/01	
Lille	6,517,414 B1	02/11/03	Tobin et al.		· · · · · · · · · · · · · · · · · · ·		03/10/00	
L.TME	6,528,409 B1	03/04/03	Lopatin et al.				04/29/02	
L.TME.	6,537,912 B1	03/25/03	Agarwal				08/25/00	
Light	6,580,958 B1	06/17/03	Takano				11/22/99	
LIME.	6,605,549 B2	08/12/03	Leu et al.				09/29/01	
L.T. n. 8	6,607,976 B2	08/19/03	Chen et al.		· · · · · · · · · · · · · · · · · · ·		09/25/01	
LITHE		09/09/03	Osterheld		 		04/05/01	
ZIME.	6,624,075 B1	09/23/03	Lopatin et al.				11/05/02	
XIME.	6,630,741 B1	10/07/03	Lopatin et al.				12/07/01	
2JME	6,660,633 B1	12/09/03	Lopatin et al.				02/26/02	
LITH-E	6,708,074 B1	03/16/04	Chi et al.				08/11/00	
L.T.ME	6,708,075 B2	03/16/04	Sonderman et al.			11/16/01		
LiTME. 6,728,587 B2 04/27/04 Goldman et al. 12/27/00								
EXAMINER DATE CONSIDERED								
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INITIALS	PATENT NO.	DATE	со	DUNTRY	CLASS	SUBCLASS	Vac I st	
			<u> </u>	<u></u>	<u> </u>		Yes	No
LJ.WE	EP 0 932 195 A1	07/28/99	EP				X.	<u> </u>
LIME	EP 1 083 470 A2	03/14/01	EP				X	
LIME	GB 2 365 215 A	02/13/02	GB				X	
	OTHE	R ART (Inclu	ding Author, Ti	tle, Date, Pertinent	Pages, Etc	c.)	1	
ACTIA C	Sun, S.C. 1998. "C	CVD and PVD	Transition Meta	l Nitrides as Diffusio	on Barriers	for Cu Metalli	zation.'	•
LITU-E	<i>IEEE</i> . pp. 243-246							
L.TME	Tagami, M., A. Furuya, T. Onodera, and Y. Hayashi. 1999. "Layered Ta-nitrides (LTN) Barrier Film by Power Swing Sputtering (PSS) Technique for MOCVD-Cu Damascene Interconnects." <i>IEEE</i> . pp. 635-638.							•
010 10 C				H. Bender, T. Nogar				
NO-116				nless I-PVD TA(N) l				PEM
LIME				000. San Diego, CA		, mai 2 milion 1 mili		
A 4-4 .	Eisenbraun, Eric, O	scar van der St	traten, Yu Zhu, K	Katharine Dovidenko	, and Alair			
L. J.M.E.	"Atomic Layer Dep			sed Materials for Zer	ro Thickne	ss Copper Barr	іег	
	Applications (Aust			d K. Pfeifer. 2001.	"Dhysical	and Electrical		
LIME				ffusion Barrier in 0.2			Backer	nd
NNA				inference 2001. Mo			Duvic.	
	Kim, Y.T. and H. Si	im. 2002. "Ch	haracteristics of P	Pulse Plasma Enhanc	ced Atomic	Layer Deposit		
L.TM+			r for Copper Inter	rconnect" (Abstract)). IEIC Tea	chnical Report.	Vol. 1	02,
- Ville	No. 178, pp. 115-11		1 f C-i-i V	0 - 1 3 f - 1 : T.L	T 1/ - A - made	C 'TI-ulde		
a				Vei-Min Li, Juhana T n Barrier Deposition				
LIME				s. Vol. 14, No. 13-14			1tomic	
	Peng, C.H., C.H. Hs	sieh, C.L. Huar	ng, J.C. Lin, M.H	I. Tsai, M.W. Lin, C.	.L. Chang,	Winston S. Shi		
LIME								
divinc.								
	Darformanaa Tastine			Kaloyeros. 2002. "				·
LIME	Performance Testing Metallization." <i>IEE</i>	E nn. 188-19	Momic Layer De	position Tantalum-D	lased Mate	riais for inanos	cale Co	pper
X, V				Chen, G.J. Wang, Y.	T. Chen, J	L. Huang, S.N	I Jang,	and
nd-n.c	M.S. Liang. 2002.	"Advanced Me	etal Barrier Free	Cu Damascene Inter	connects w			W
LIVE.	.Carbide Barriers for	90/65-nm BE	OL Technology."	" <i>IEEE</i> . pp. <u>5</u> 95-59	8.		<u></u>	
LTIME	July 25, 2003. Inter-	national Search	h Report for PCT	/US02/24858.				
L. J.WE	March 30, 2004. W	ritten Opinion	for PCT/US02/1	9062.				
L.J.ME	April 9, 2004. Writt	ten Opinion for	r PCT/US02/191	16.		*		
R. TN-E.	April 22, 2004. Offi	ice Action for	U.S. Serial No. 0	9/998,372, filed No	vember 30	, 2001.		
EXAMINER			DA	TE CONSIDERED				
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INFORMATION DISCLOSURE	ATTY. DOCKET NO.	SERIAL NO.			
CITATION IN AN	005918 USA/ FPS/MMCS/APC	09/943,955			
APPLICATION	FF3/MMC3/ALC				
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	APPLICANT				
AD6 1 1 2004 (3)	SHANMUGASUNDRAM	et al.			
	FILING DATE	GROUP			
ADE 1 1 2004 E	August 31, 2001	1765			
OTHER ART (Including Author,	Title, Date, Pertinent Pages,	Etc.)			
L.J. M.E. April 28, 2004. Written Opinion for PCT/US02	2/19117.				
L.TNE, April 29, 2004. Written Opinion for PCT/US02	2/19061.				
LIME May 5, 2004. International Preliminary Examin	nation Report for PCT/US01/27	406.			
LJUE, May 28, 2004. Office Action for U.S. Serial No.	o. 09/943,383, filed August 31,	2001.			
LIME June 3, 2004. Office Action for U.S. Serial No.	09/928,474, filed August 14, 2	001.			
LTML June 23, 2004. Office Action for U.S. Serial No. 10/686,589, filed October 17, 2003.					
L.TME June 30, 2004. Office Action for U.S. Serial No. 09/800,980, filed March 8, 2001.					
LIME July 12, 2004. Office Action for U.S. Serial No.	o. 10/173,108, filed June 8, 2002	2.			
L.TME.					
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		U	.S. PATENT DO	CUMENTS			
EXAMINER'S INITIALS	PATENT NO.	DATE	N	IAME	CLASS	SUBCLASS	FILING DATE
LOTINE.	6,381,564 B1	04/30/02	David et al.				05/03/99
J. J. W.E.	2002/0183986 A1	12/05/02	Stewart et al.				05/30/01
LIME	2003/0154062 A1	08/14/03	Daft et al.				10/15/01
L. J.M.E	6,529,789 B1	03/04/03	Campbell et al.				03/14/02
2 TME	6,774,998 B1	08/10/04	Wright et al.				12/27/01
LIME LIME	6,751,518 B1	06/15/04	Sonderman et al.				04/29/02
LIJWE	6,678,570 B1	01/13/04	Pasadyn et al.				06/26/01
2. T.WE.	6,735,492 B2	05/11/04	Conrad et al.				07/19/02
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		FILING DATE	GROUP
		August 31, 2001	1765
	OTHER ART (Including Author, T	litle, Date, Pertinent Pages, E	tc.)
LITWE S	eptember 15, 2004. Office Action for U.S. Ser	rial No. 10/632,107, filed Augus	st 1, 2003.
	eptember 29, 2004. Office Action for U.S. Ser	rial No. 09/363,966, filed July 2	9, 1999.
LITIME C	October 1, 2004. International Preliminary Example 1	mination Report for PCT Serial	No. PCT/US03/23964.
L.J.WEC	October 6, 2004. Office Action for U.S. Serial 1	No. 10/759,108, filed January 2	0, 2004.
L.J.ME C	October 12, 2004. International Preliminary Ex	amination Report for PCT Seria	l No. PCT/US02/19061.
LIT, WE N	November 17, 2004. Written Opinion for PCT	Serial No. PCT/US01/27407.	
EXAMINER	· • .	DATE CONSIDERED	
Lynette	J. Vme - Eunini	12/27/2004	<i>F</i>

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

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EXAMINER'S PATENT NO. DATE NAME CLASS SUBCLASS DATE	INFORMATION DISCLOSURE CITATION IN AN			ATTY. DOCKET N 005918 USA/ FPS/MMCS/APC		SERIAL NO. 09/943,955		
APPLICANT SHANMURASUNDRAM et al. FILING DATE August 31, 2001 I765		APPLIC	CATION			1		
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Company Comp			03/06/01	Miller et al.		 	<u> </u>	10/01/98
OTHER ART (Including Author, Title; Date, Pertinent Pages; Etc.) August 9, 2004. Written Opinion for PCT Serial No. PCT/US02/19063.	9-70N-E	6,228,280 B1	05/08/01	Li et al.				05/06/98
OTHER ART (Including Author, Title, Date, Pertinent Pages), Etc.) August 9, 2004. Written Opinion for PCT Serial No. PCT/US02/19063.	P. TON-E.	6,432,728 B1	08/13/02	Tai et al.			†	10/16/00
OTHER ART (Including Author, Title, Date, Pertinent Pages), Etc.) LTM: August 9, 2004. Written Opinion for PCT Serial No. PCT/US02/19063.	2.T. 11-E		08/26/03	Tran		+	+	07/14/00
August 9, 2004. Written Opinion for PCT Serial No. PCT/US02/19063.	W. C.					+	<u> </u>	
August 9, 2004. Written Opinion for PCT Serial No. PCT/US02/19063.			<u> </u>					
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EXAMINER'S INITIALS PATENT NO.	DATE	N	AME	CLASS	SUBCLASS	FILING DATE	
L.T. NE 5,975,994	11/02/99	Sandhu et al.				06/11/97	
LIME 6,113,462	09/05/00	Yang				12/18/97	
L. JME 6,230,069 B1	05/08/01	Campbell et al.				06/26/98	
LJME 6,268,270 B1	07/31/01	Scheid et al.				10/29/99	
L. The 6,277,014 BI	08/21/01	Chen et al.				10/09/98	
LITINE 6,291,367 BI	09/18/01	Kelkar			<u> </u>	06/01/00	
LINE 6,465,263 B1	10/15/02	Coss, Jr. et al.	·			01/04/00	
XJM-E. 6,532,555 B1	03/11/03	Miller et al.				10/29/99	
L of M-5 6,535,783 B1	03/18/03	Miller et al.				03/05/01	
L. The 6,541,401 B1	04/01/03	Herner et al.	- · · · · · · · · · · · · · · · · · · ·			07/31/00	
XITUE, 6,546,508 B1	04/08/03	Sonderman et al	•		<u> </u>	10/29/99	
L.J.M-9 6,556,881 B1	04/29/03	Miller				09/09/99	
LIT N-E 6,652,355 B2	11/25/03	Wiswesser et al.	,	<u>. </u>		06/04/01	
L.JNE 6,725,402 B1	04/20/04	Coss, Jr. et al.				07/31/00	
OTHE	R ART (Inclu	ding Author, Tit	le, Date, Pertinent	Pages, Etc	2)********		
			. Cappelli, and K. C			93. "Two	
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Chang, and M.Y. I	ee. June 16-1	7, 1998. "A Rea	ig, C.L. Lee, C.H. W l-Time Equipment N	Monitoring 1	_		
LIJVIE System." Semicon	ductor Manufo	acturing Technolo	ogy Workshop, pp. 1	11-121.			
			ration at AMD with			325-327.	
			0/172,977, filed Jun				
	August 2, 2004. Office Action for U.S. Serial No. 10/174,377, filed June 18, 2002.						
4 4 4 4			nation Report for Po			/19116.	
1 0 0 0		 	o. 10/135,405, filed				
			o. 09/998,384, filed		30, 2001.		
September 9, 2004	· · · · · · · · · · · · · · · · · · ·						
AL AL CI	4. Internationa	al Preliminary Ex	amination Report fo	r PCT Seri	al No. PCT/US	502/24859.	
EXAMINER 01	C	DA	TE CONSIDERED				
Lynette J. Ung			1 2/12/2				